

10-control gate 11-floating gate

44-p+ implant

15-tunnel oxide 16- p-substrate 48-edge erase

14- ONO

FIG.1 (Prior Art)

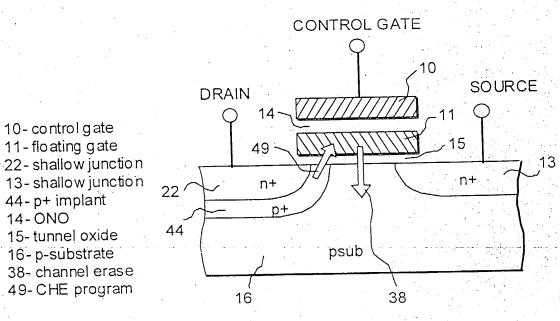
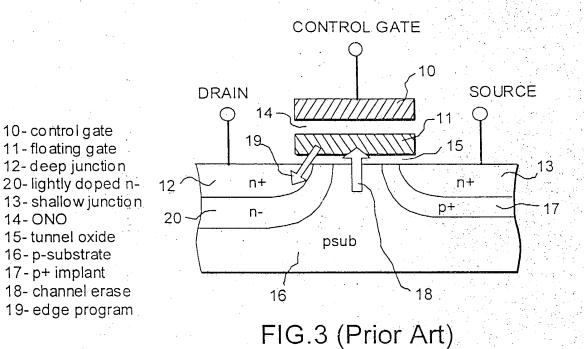
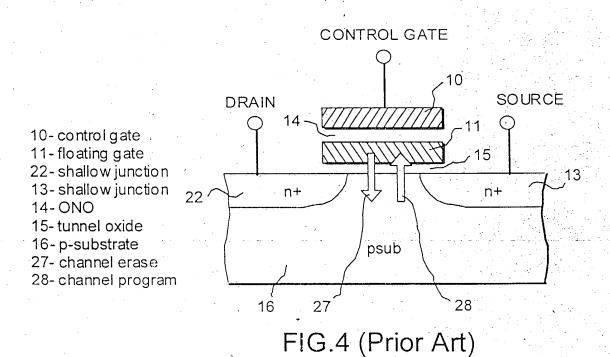
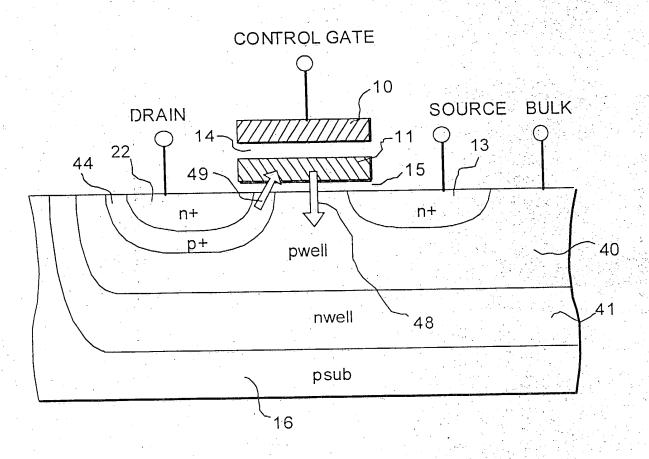


FIG.2(Prior Art)







10- control gate

11- floating gate

22- shallow junction

13- shallow junction

44- p+ implant

14- ONO

15-tunnel oxide

38-channel erase

49-CHE program

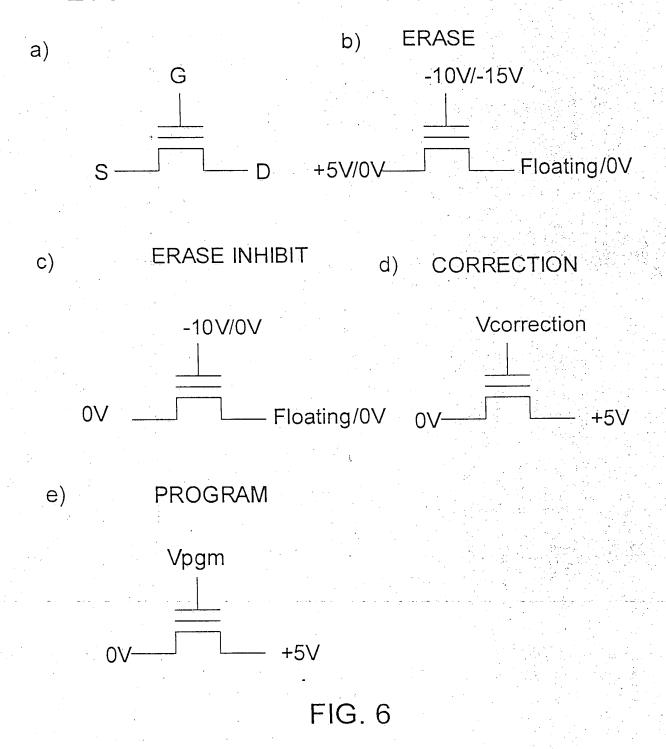
40- p-well

41- deep n-well

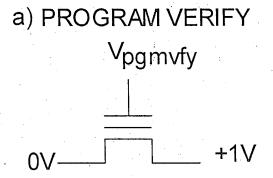
16- p-substrate

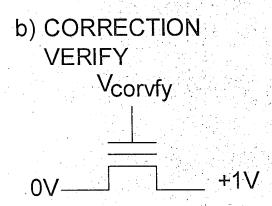
FIG.5 (Prior Art)

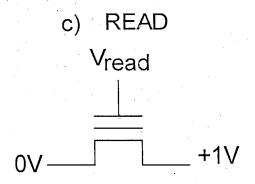
ETOX NOR Cell on a P-substrate



ETOX NOR Cell on a P-substrate







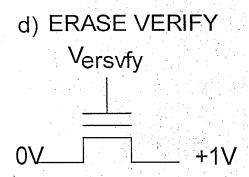


FIG. 7

ETOX NOR Cell on a P-substrate

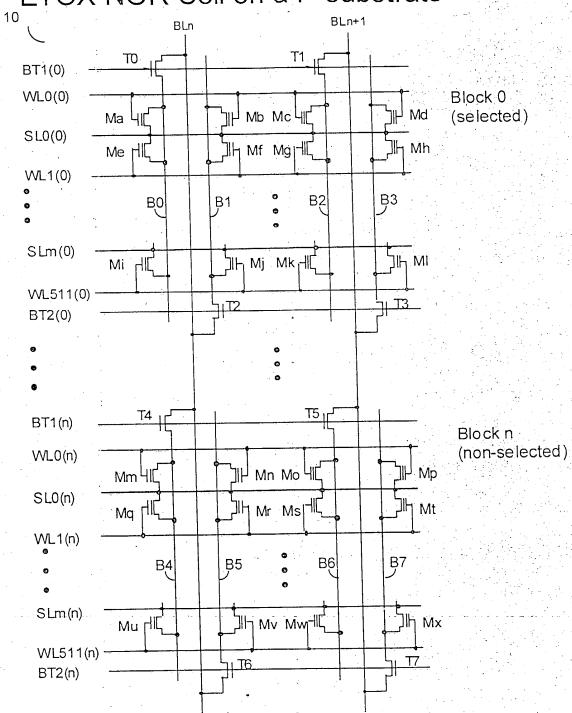


FIG.8

Block Erase Operations

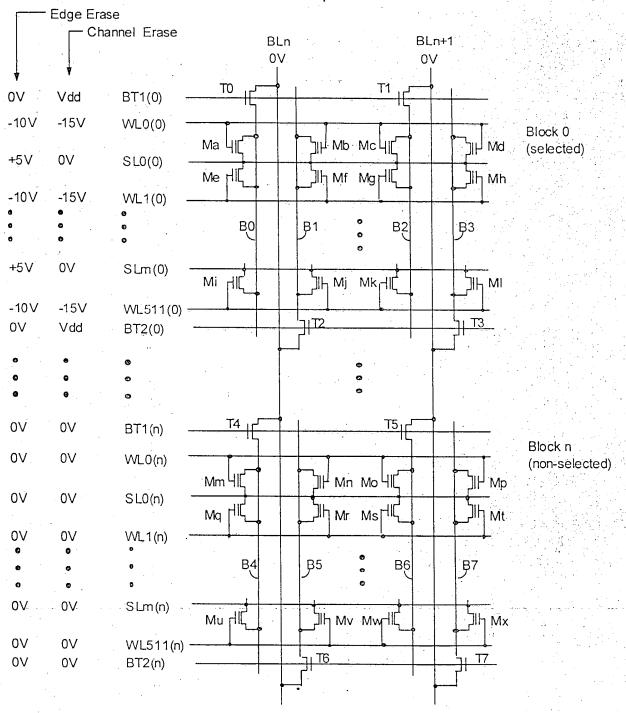


FIG. 9

Block Erase Verify

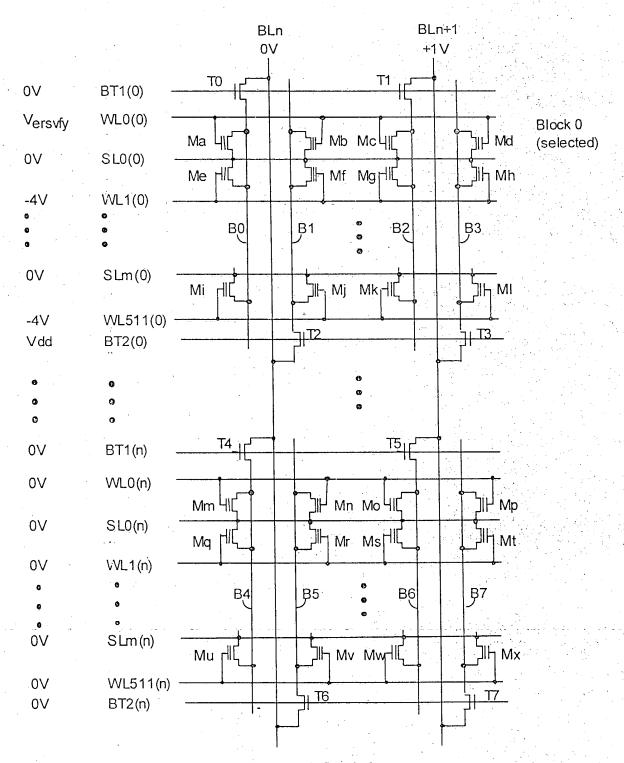


FIG.10

Erase Inhibit

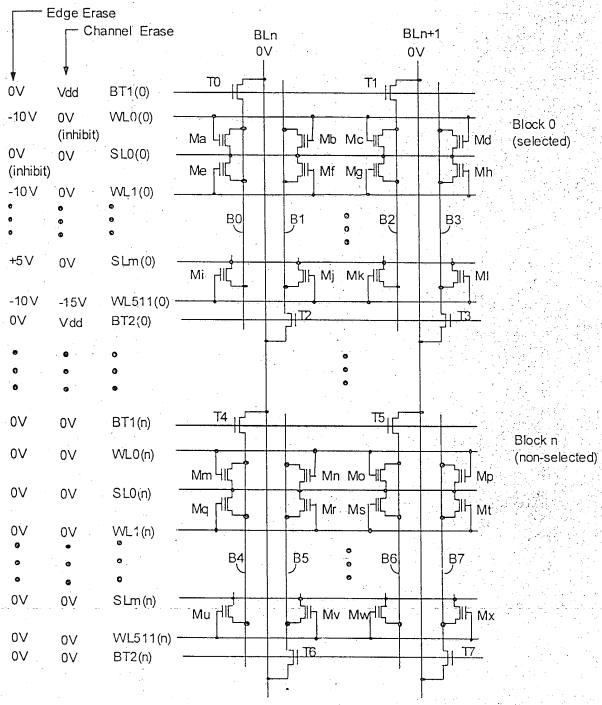


FIG. 11

Correction Operations

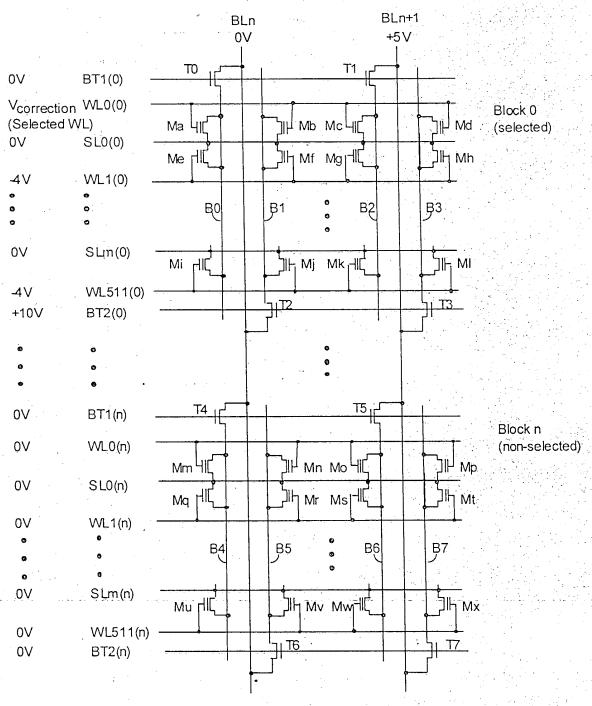


FIG. 12

Correction Verify Operations

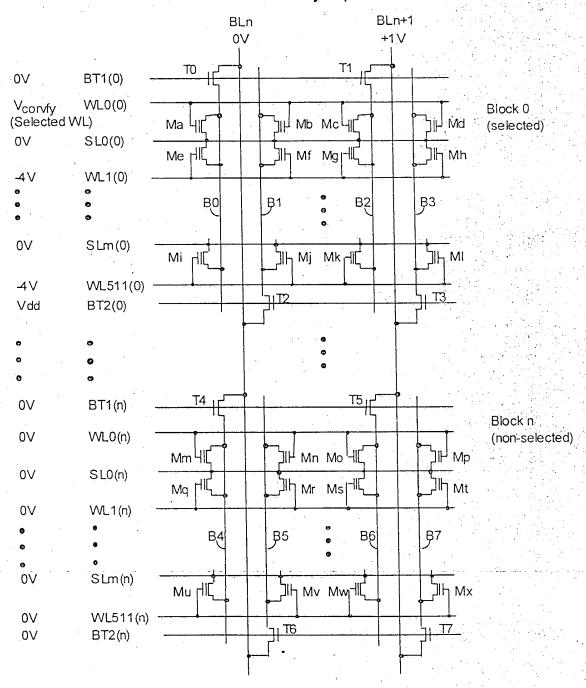


FIG. 13

Program Operations

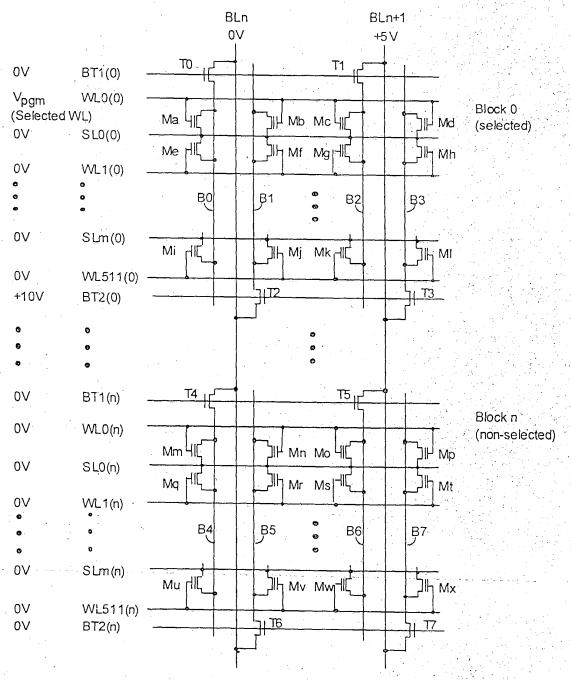


FIG. 14

Program Verify Operations

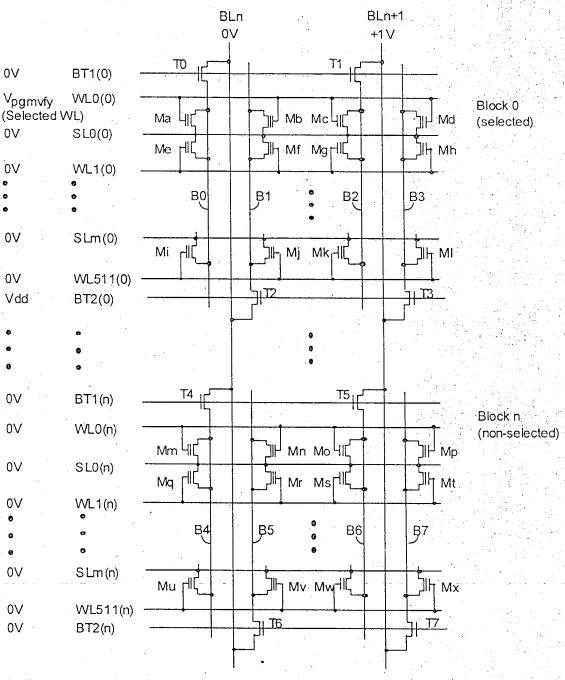
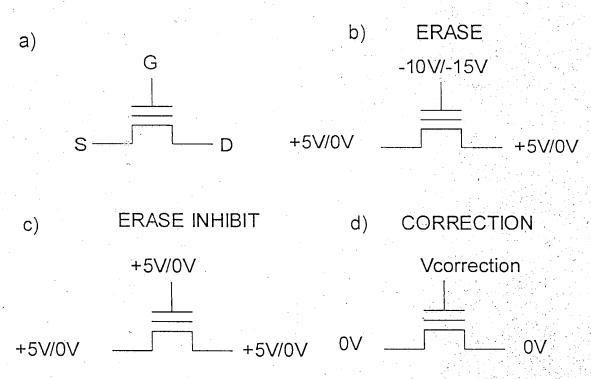


FIG. 15

Cell on a P-substrate for this invention



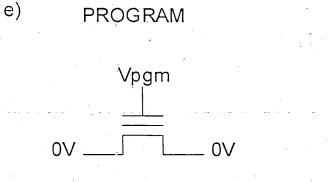
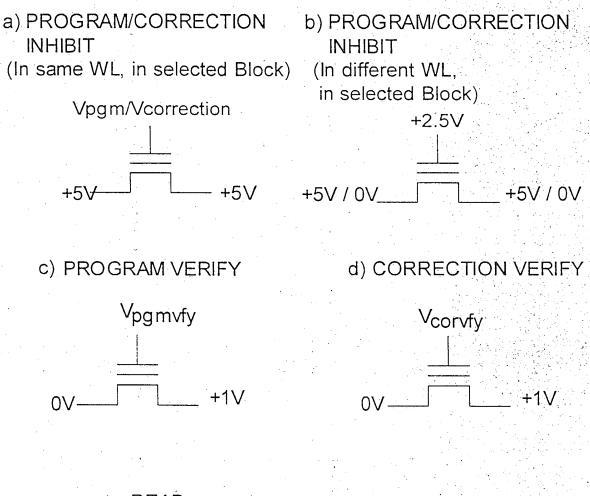
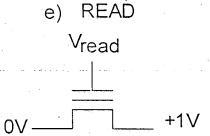


FIG. 16

Cell on a P-substrate for this invention





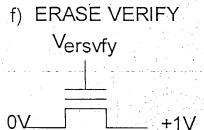


FIG. 17

AND Array on a P-substrate

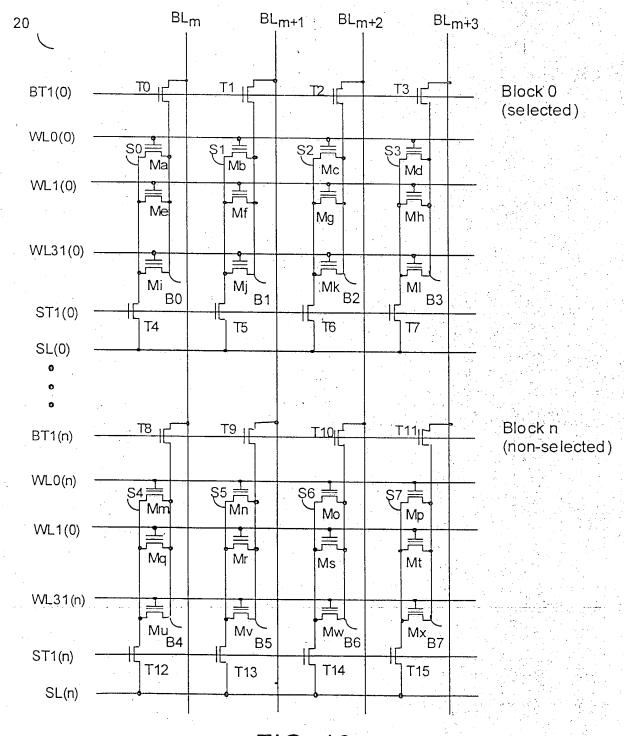


FIG. 18

Random Page Erase Operation

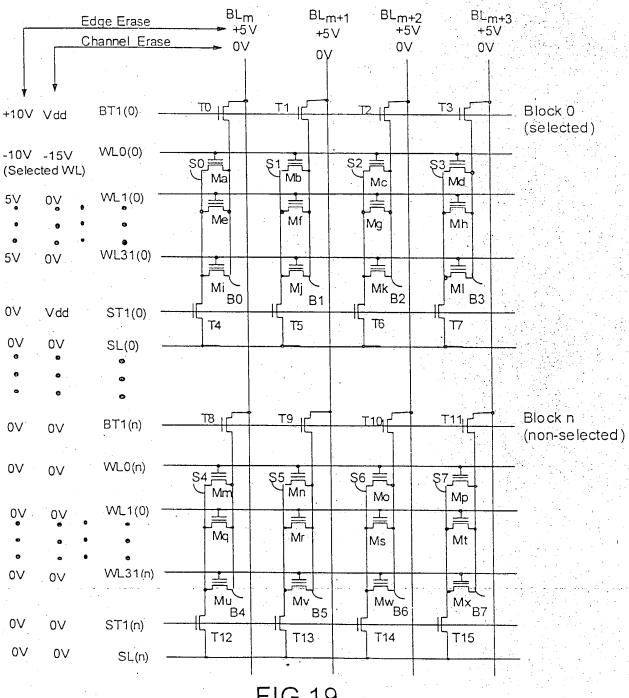


FIG.19

Random Page Erase Verify Operation

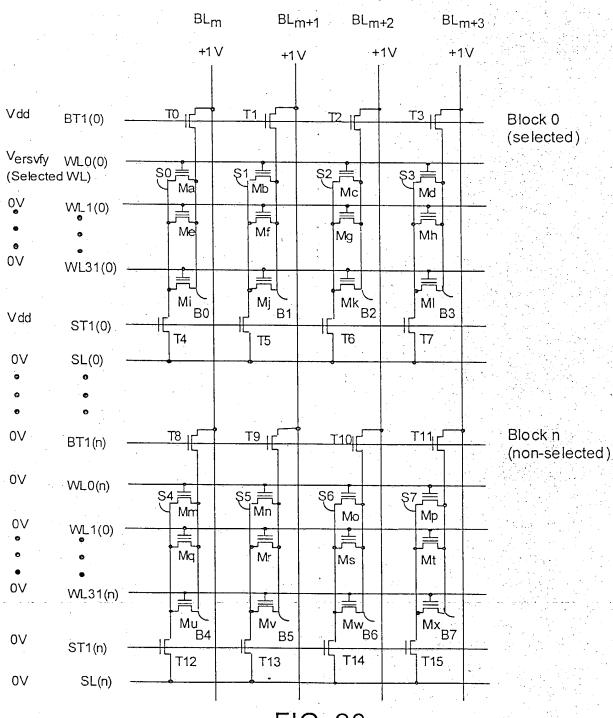


FIG. 20

Block Erase Operations

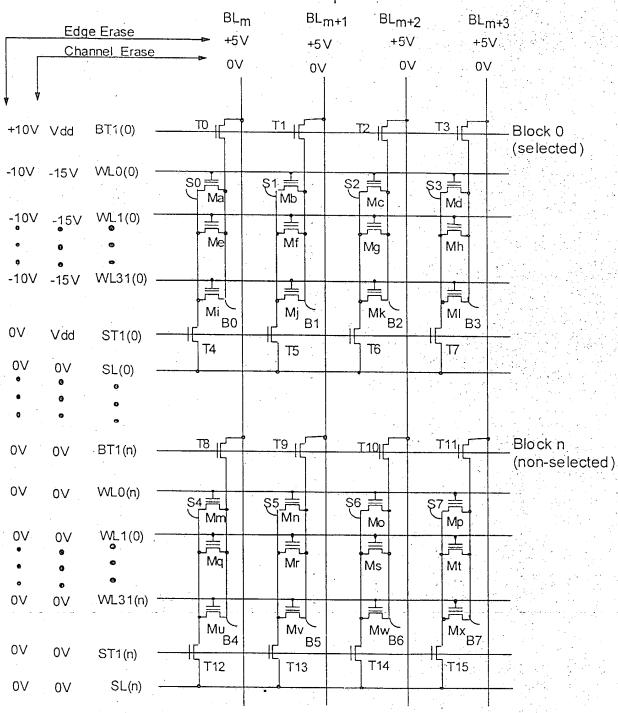


FIG.21

Block Erase Verify

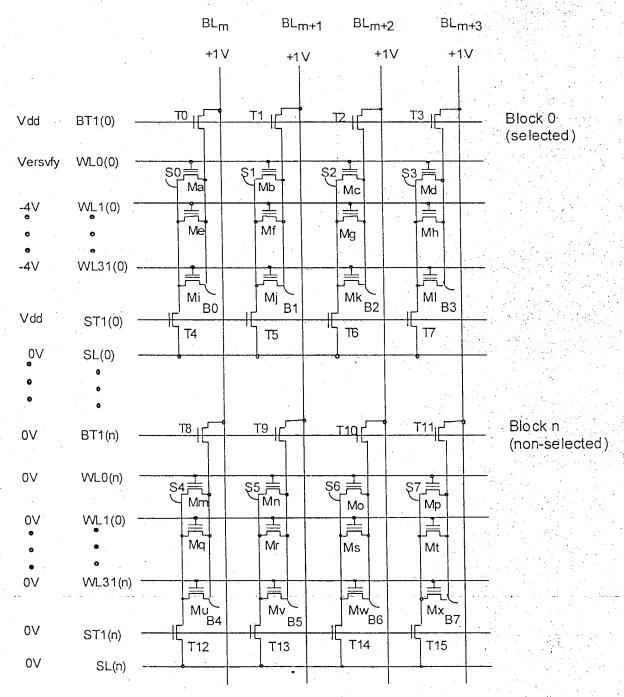


FIG. 22

Block Erase Inhibit

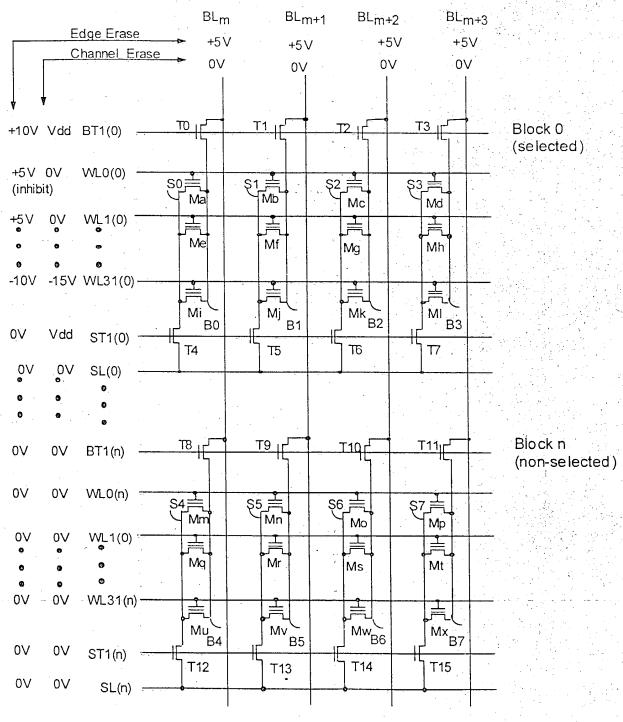


FIG. 23

Correction Operation

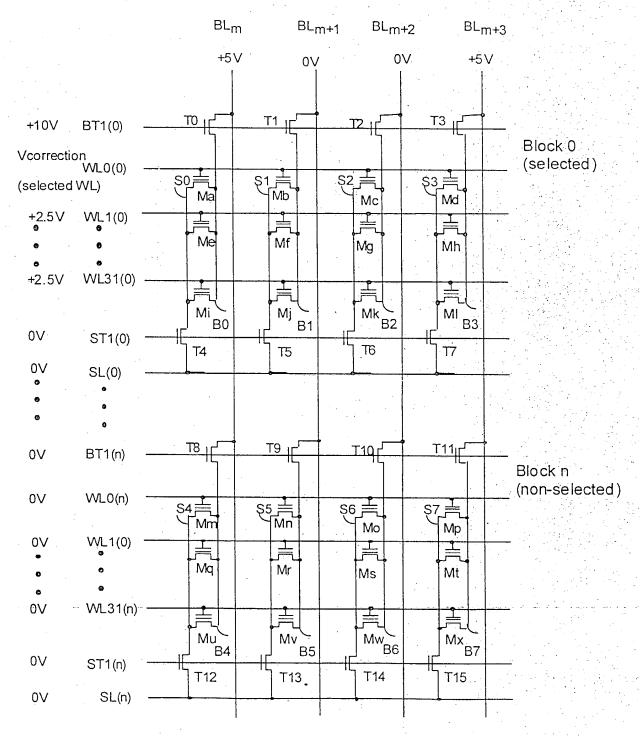


FIG. 24

Correction Verify

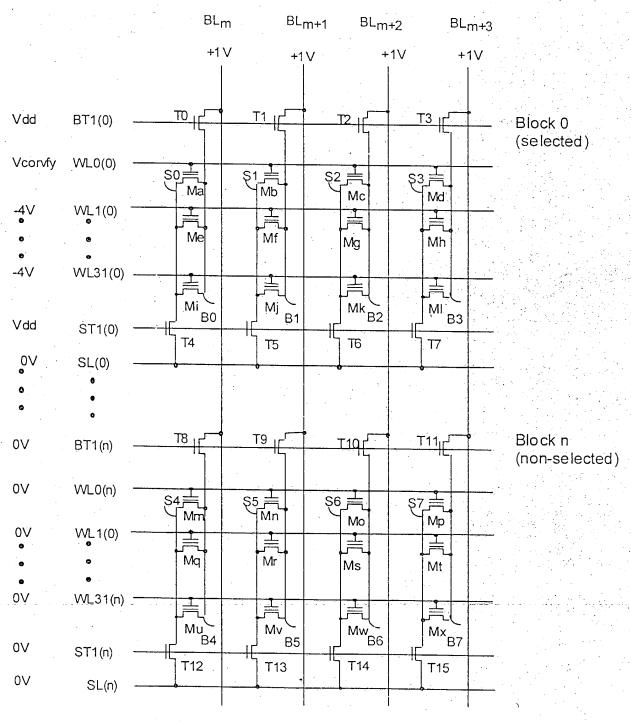


FIG. 25

Random Page Program Operation

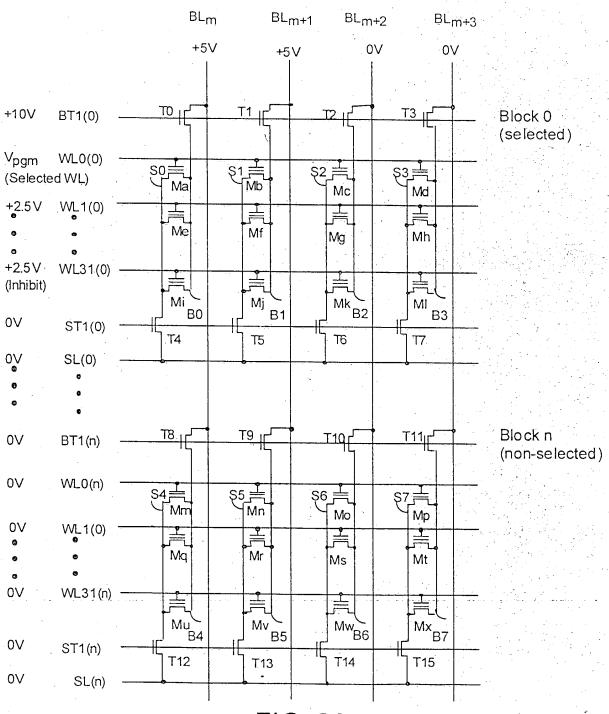


FIG. 26

Random Page Program Verify Operation BLm BL_{m+1} BL_{m+2} BL_{m+3} +1 V +1V +1V +1 V Vdd BT1(0) Block 0 (selected) $V_{pgm vfy}$ WL0(0) \$0j= \$1.5E (Selected WL) Мс Md ٥٧ WL1(0) Mf Mh Mg 0V WL31(0) Mi N Mj <u>B1</u> Mk B2 MI B3 Vdd ST1(0) T4 T5 T6 T7 . 0V SL(0) Block n T8 15 T9 II T11_| 0V BT1(n) (non-selected) 0∨ WLO(n) S4 壳 \$5.∰ |Mn Ş6 <u></u> Мо Мр 0V WL1(0) Mq Mr

FIG. 27

Mw_{B6}

T14

Mx B7

T15

Mv B5

T13

0V

0V

0V

WL31(n)

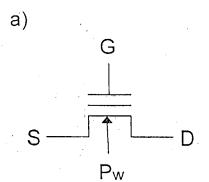
ST1(n)

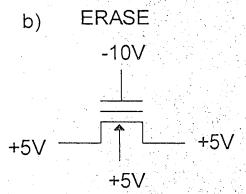
SL(n)

Mu B4

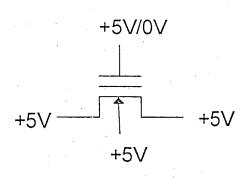
T12

ETOX NOR cell on a P-well

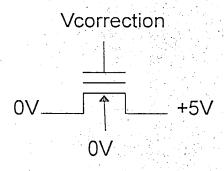




c) ERASE INHIBIT



d) CORRECTION



e) PROGRAM

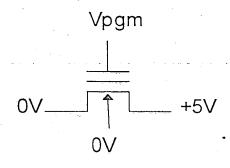


FIG. 28

ETOX NOR cell on a P-well

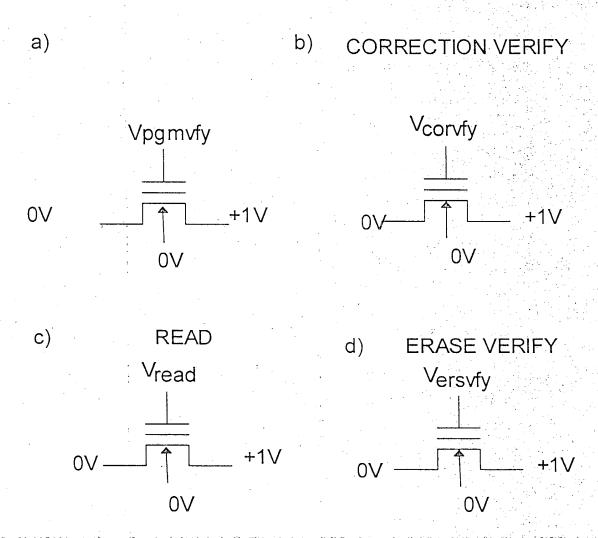


FIG. 29

ETOX NOR Array on a Pwell

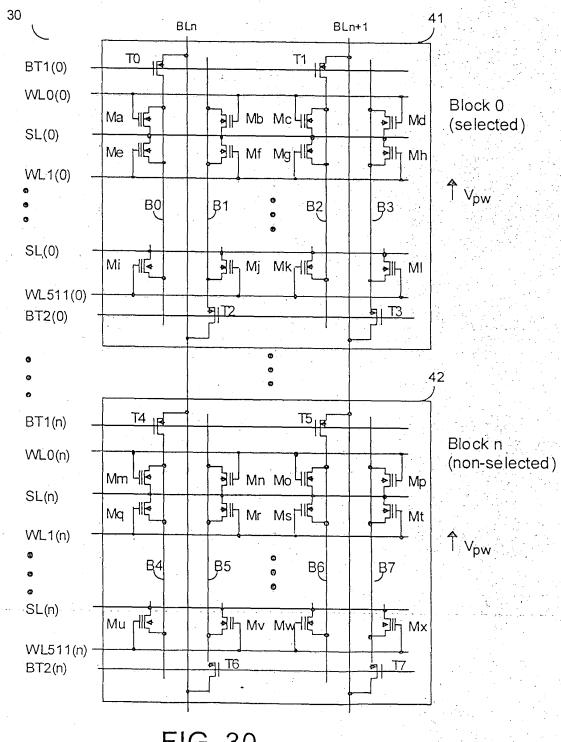


FIG. 30

Block Erase Operations

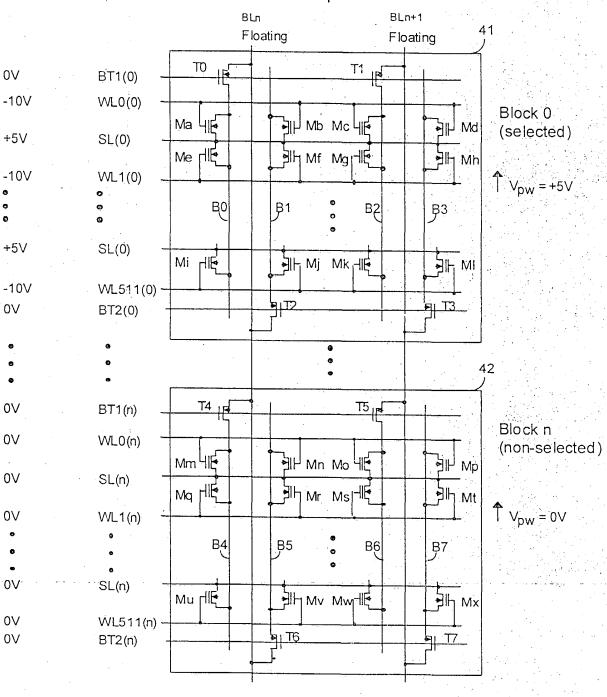


FIG. 31

Block Erase Verify

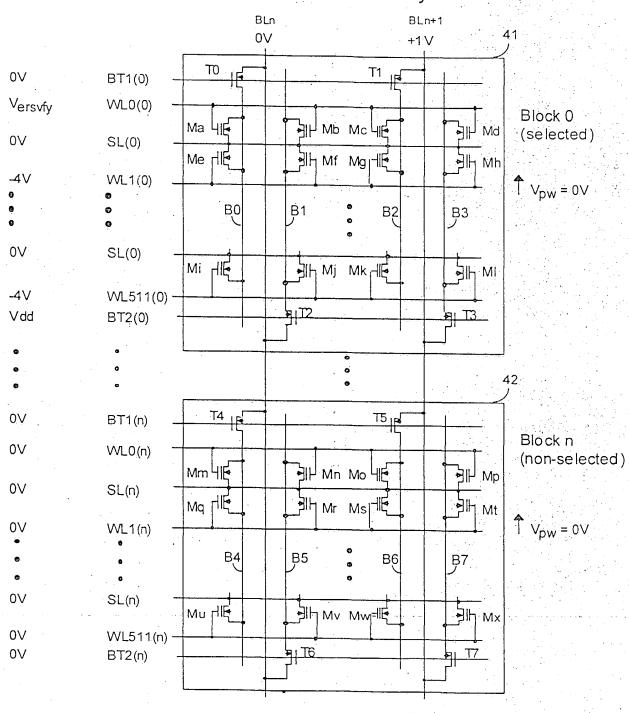


FIG. 32

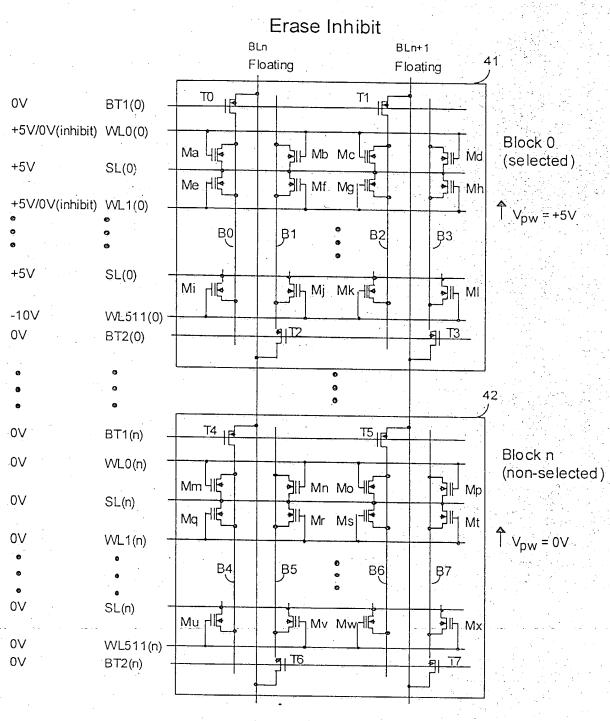


FIG. 33

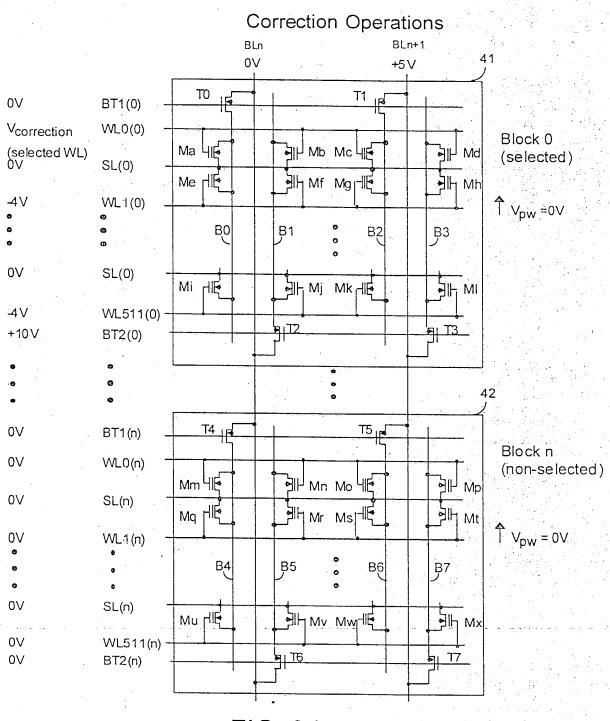


FIG. 34

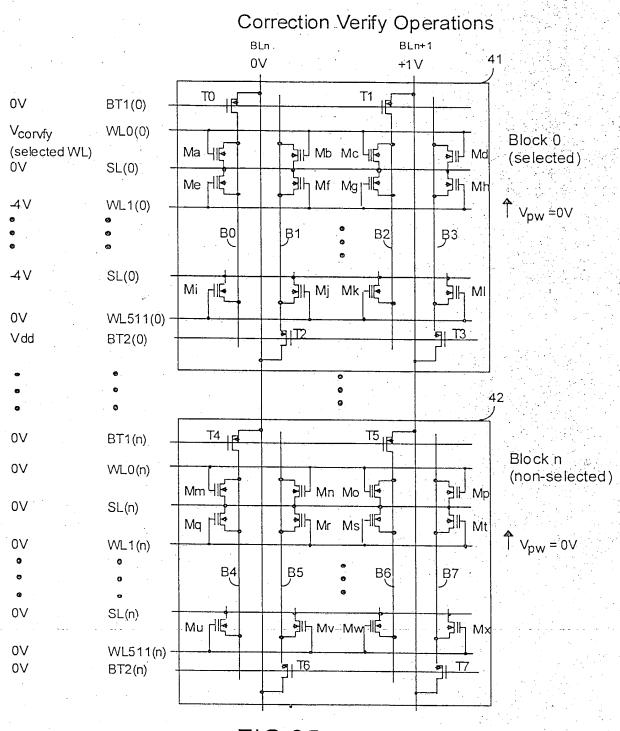


FIG.35

Program Operations BLn BLn+1 0V +5V 0V BT1(0) V_{pgm} WL0(0) Block 0 (Selected WL) Ма ЧЕ THE MO MCHE JH Ma (selected) ÓV SL(0) Ме НЕ All Mf MgHE 커H Mh 0V WL1(0) $v_{pw} = 0$ B₀ Ŗ1 B2 **В**3 0V SL(0) Mi HE All Mk Ale 0V WL511(0) H12 +10V eji T3 BT2(0) 42 BT1(n) T4 15 0V Block n 0V WL0(n) (non-selected) Mm 416 AL NO HE JI Mp 0V SL(n) Ma HIE HMr Ms }⊩ Mt $\hat{T} V_{pw} = 0V$ 0V WL1(n) B₄ Ŗ5 Ŗ7 B6 SL(n) Mu HE H MV MW-16 0V WL511(n) 0V म्। 16 j 17 BT2(n)

FIG. 36

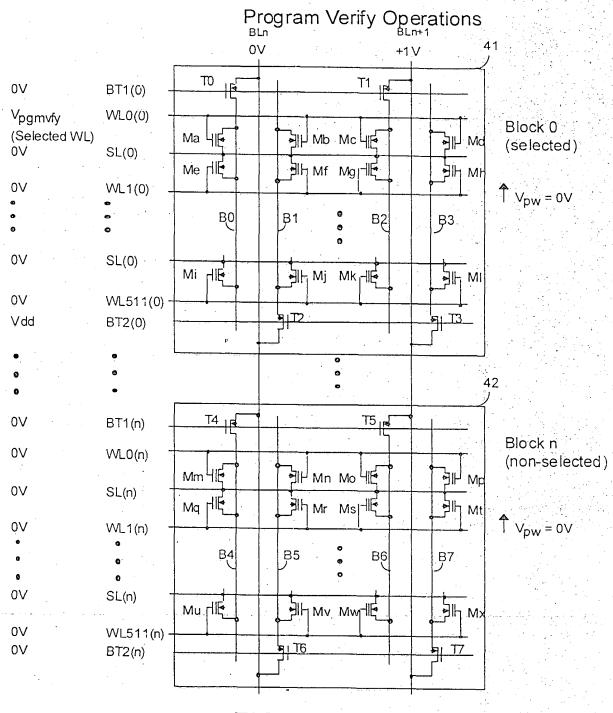


FIG. 37

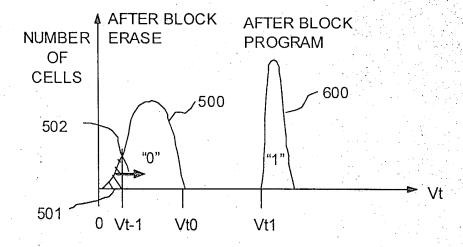


FIG.38a (Prior Art)

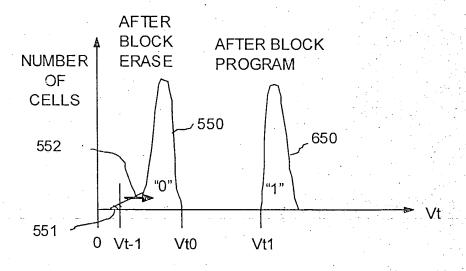


FIG.38b

BLOCK ERASE OPERATION

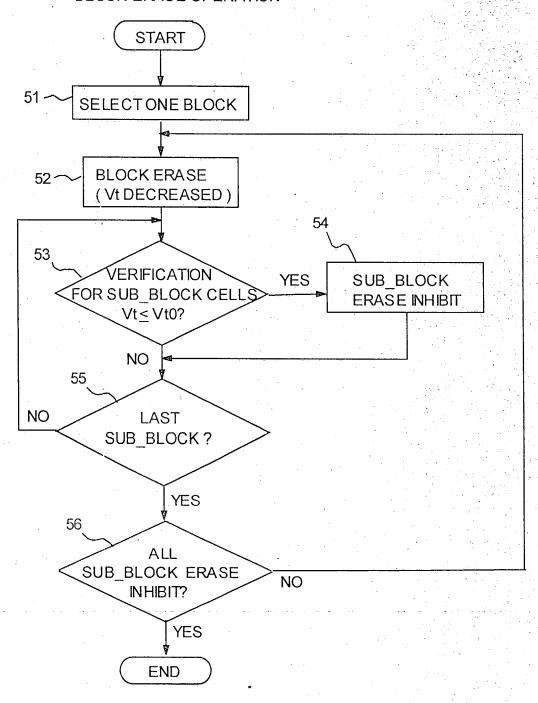


FIG. 39

CORRECTION OPERATION

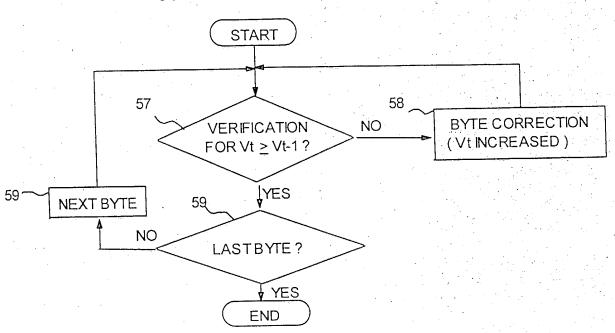


FIG. 40

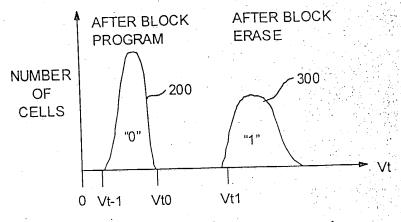


FIG.41a (Prior Art)

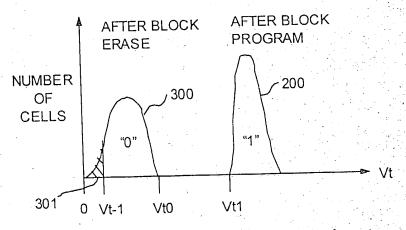


FIG.41b (Prior Art)

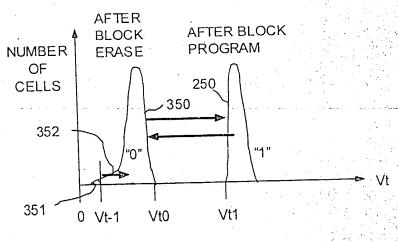


FIG.41c

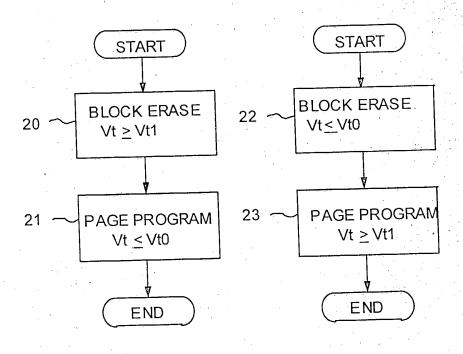


FIG.42a (Prior Art)

FIG.42b (Prior Art)

BLOCK ERASE OPERATION

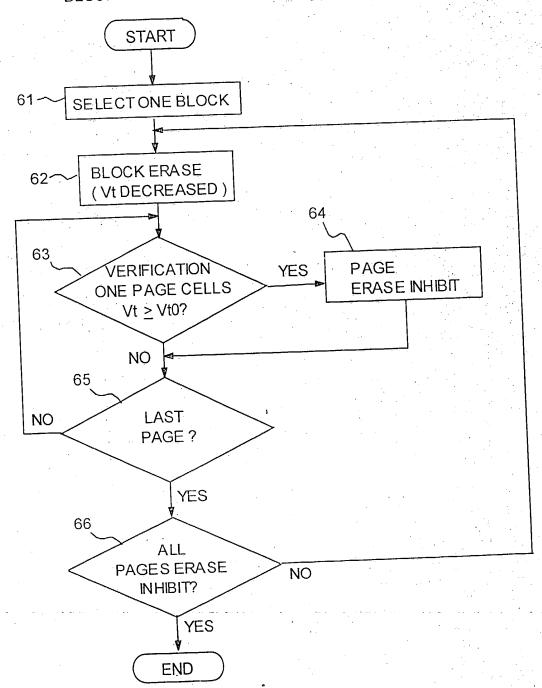


FIG. 43

CORRECTION OPERATION

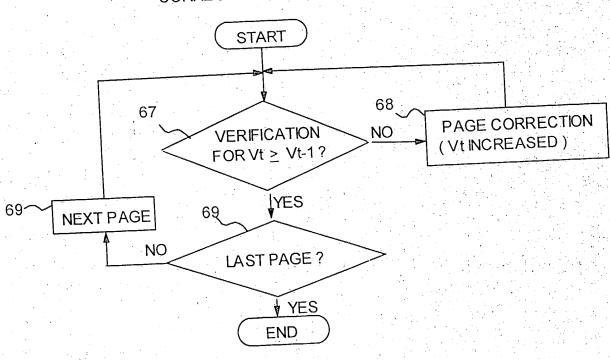


FIG. 44